An experimental study of effects on schoolchildren of exposure to point-of-sale cigarette advertising and pack displays

Melanie Wakefield*, Daniella Germain, Sarah Durkin and Lisa Henriksen

Abstract

By creating a sense of familiarity with tobacco, cigarette advertising and bold packaging displays in stores where children often visit may help to pre-dispose them to smoking. A total of 605 ninth-grade students were randomly allocated to view a photograph of a typical convenience store point-of-sale which had been digitally manipulated to show either cigarette advertising and pack displays, pack displays only or no cigarettes. Students then completed a self-administered questionnaire. Compared with those who viewed the no cigarettes, students either in the display only condition or cigarette advertising condition perceived it would be easier to purchase tobacco from these stores. Those who saw the cigarette advertising perceived it would be less likely they would be asked for proof of age, and tended to think a greater number of stores would sell cigarettes to them, compared with respondents who saw no tobacco products. Respondents in the display only condition tended to recall displayed cigarette brands more often than respondents who saw no cigarettes. Cigarette advertising similarly influenced students, and tended to weaken students’ resolve not to smoke in future. Retail tobacco advertising as well as cigarette pack displays may have adverse influences on youth, suggesting that tighter tobacco marketing restrictions are needed.

Introduction

As usual avenues for tobacco advertising have become increasingly unavailable, the visual presence of the cigarette pack and the in-store pack display has become an essential means of communicating brand imagery for tobacco companies [1, 2]. Tobacco industry documents indicate that tobacco companies understood the importance of the cigarette pack display as a means of promoting brand awareness: ‘The aim of the exercise is instant recognition: (Horizon) along with Benson & Hedges, that’s given us full gold and blue blocks on display and that helps our brands stand out’ [3].

It has been demonstrated that widespread in-store tobacco advertising can influence and distort adolescents’ perceptions regarding popularity, use and availability of tobacco. Experimental research has shown that adolescents exposed to retail tobacco advertising perceived significantly easier access to cigarettes than a control group [4]. Advertising exposure also influenced perceptions about smoking prevalence, peer approval for smoking and support for tobacco control policies [4]. Another study [5] found that schoolchildren exposed to point-of-sale advertisements were more likely than those exposed to a photograph of a pack of cigarettes to report positive attributes of users of the brand of cigarettes. Further research has shown that adolescents who reported...
at least weekly exposure to retail tobacco marketing were more likely to have experimented with smoking [6] and that in-store branded tobacco advertising and promotion are strongly associated with choice of cigarette brands by adolescents [7].

The presence of tobacco in stores alongside everyday items such as confectionery, soft drinks and magazines helps to create a sense of familiarity with tobacco products. This familiarity may act to de-emphasize the serious health consequences of tobacco consumption and increase youth perceptions of the prevalence of smoking, as well as their perceived access to tobacco products [8]. The presence of tobacco products in neighbourhood retail outlets conveys to young people that tobacco use is desirable, socially acceptable and prevalent in society [9].

In Victoria, Australia, point-of-sale tobacco advertising has been banned since January 2002, and cigarette pack displays are limited to one pack face per brand variant. An observational study conducted following the implementation of this law found that, although compliance was evident, displays emerged that tilted packs towards the floor, providing maximum viewing of the top of all the packs queued in the display and a consequently greater visual and colourful presence for each brand variant [10]. Efforts to enhance the displays to achieve maximum ‘standout’ for cigarette brands has led researchers to be concerned that cigarette displays at the point-of-sale may be just as influential as traditional advertising, acting as a promotional tool for cigarette brands.

The present study aims to examine the effect of cigarette packaging displays and advertising at the point-of-sale on students’ smoking-related perceptions, beliefs and intentions. Given previous research, we hypothesized that exposure to retail tobacco advertising and cigarette pack displays at the point-of-sale would influence students’ perceptions about ease of access to cigarettes, normative beliefs about smoking, perceived harms of smoking, perceived popularity of cigarette brands and future intentions to smoke.

### Methods

#### Participants

Data collection took place in late 2003 and early 2004 from a convenience sample of ninth-grade students (aged 14–15 years) from five secondary schools in Victoria, Australia: two Catholic boys schools, a private co-educational school, a public co-educational school and a Catholic girls’ school. Three of the schools were located in areas that had above average level of socio-economic advantage for Victoria, while the other two schools were in areas that had below average level of socio-economic advantage [11].

Schools were approached by a research assistant to determine willingness to have their students involved in the study. Schools were informed that the study would be an investigation into product advertising in convenience stores. Specific detail about examining tobacco marketing was not disclosed, to avoid risk of priming student’s responses. Information was sent home to students’ parents, along with a consent form, to obtain parental permission to be involved in the study. Out of 886 ninth-grade students approached, active parental permission was obtained for 605 students, resulting in an overall response rate of 68%.

#### Design

The between-subjects experimental study design was adapted from that developed by Henriksen et al. [4]. Within each classroom, participants were randomly exposed to one of the three point-of-sale conditions under the guise of pre-testing a news story written for teenagers.

**No cigarettes**

A convenience store’s point-of-sale area with no visible tobacco presence.

**Cigarette display**

A convenience store’s point-of-sale area with a cigarette pack display, but no cigarette advertising (as required by the current law in Victoria).
Cigarette advertising

A point-of-sale area with both cigarette advertising and cigarette pack displays.

A colour photograph of a point-of-sale section of a convenience store was digitally altered to create the three versions of the same retail environment. Adobe Photoshop was used to eliminate cigarette advertising and cigarette pack displays and to replace these with other non-tobacco product advertising or displays. No retailers or customers were visible in the photographs and references to store names were removed.

Procedure

Trained research assistants visited schools to administer the study. Before the experimental manipulation, all students took part in a discussion designed to increase the salience of general brand advertising and display. Following the discussion of brand advertising, students within classrooms were randomly assigned to see photographs of one of the three conditions. A research assistant then read aloud a fictional news story about teen eating habits and visits to convenience stores. Students were told to look carefully at the photograph they were given of the point-of-sale, and asked to imagine walking around the shop noticing what to buy, while they listened to the story.

After the news story had been read out, the research assistant collected all point-of-sale photographs to ensure students did not subsequently refer back to them. Students then completed a brief questionnaire. The entire data collection session was completed during a class period of ~45 min.

Dependent variables

Perceived difficulty of access

Students were asked about their own, and students their age, likelihood of being able to purchase tobacco from the pictured stores, using a Likert scale ranging from ‘1 = very easy’ to ‘5 = very hard’. These two questions were combined and averaged to create an overall measure of perceived difficulty of purchasing tobacco (α > 0.70). Students were also asked about the likelihood they would be asked for proof of age if they tried to purchase cigarettes at the store, using a Likert scale ranging from ‘1 = very likely’ to ‘5 = very unlikely’. Finally, students were asked to estimate how many stores in their neighbourhood would sell tobacco to them, and to other students their age.

Normative beliefs

Perceived prevalence of smoking was assessed by asking how many out of 100 classmates in their year level, 100 high school students and 100 adults they thought smoked cigarettes at least once a week. Perceived approval of smoking was measured by asking students how much they agreed or disagreed on a Likert scale ranging from ‘1 = strongly agree’ to ‘5 = strongly disagree’ with a range of attributes to describe smokers (‘A teenager who smokes cigarettes seems ... cool; successful; smart; healthy; athletic; and popular’). Perceived peer approval was measured by asking students whether most students their age, and most high school students, ‘think it’s ok to smoke cigarettes once in a while’. These two questions measured on a Likert scale from ‘1 = strongly agree’ to ‘5 = strongly disagree’, were combined and averaged to create an overall ‘peer approval of smoking’ measure (α > 0.70).

Perceived harm

Students were asked whether they agreed or disagreed that ‘Smoking can harm your health’, and how dangerous they thought it was to smoke <10 cigarettes a day, and one or two cigarettes occasionally, on a Likert scale ranging from ‘1 = not dangerous’ to ‘3 = very dangerous’.

Perceived brand popularity

We asked students to nominate the brand they would be likely to smoke if they were a smoker, and then nominate what they thought were the most popular brands smoked by students their age and adults. In order to examine whether cigarette displays and advertising influenced which brands students thought were the most popular, the cigarette brands that were clearly advertised in the cigarette advertising condition (Benson & Hedges,
Lucky Strike, Horizon, Marlboro and Winfield) were coded as ‘advertised brands’. Similarly, those cigarette brands that were the most prominent in the cigarette display and cigarette advertising conditions were coded as ‘prominently displayed brands’. These brands were determined by their visual presentation in the display, based on the criteria of being presented by a block of colour or a block with a distinctive feature of the pack (e.g. the prominent stripe on Alpine and Winfield packs). Prominently displayed brands included Horizon, Dunhill, Winfield, Benson & Hedges and Alpine.

**Intention to smoke**

To gauge students’ future intentions to smoke, students were asked whether they thought they would smoke a cigarette at any time during the next year, with responses being ‘definitely not, probably not, probably yes or definitely yes’. Students who had not tried smoking were also asked if they thought they would try a cigarette soon, and also ‘If one of your best friends were to offer you a cigarette, would you smoke it?’ with responses also being ‘definitely not, probably not, probably yes or definitely yes’.

**Descriptive variables**

Students indicated their sex, whether they had any older brothers or sisters, or a parent or guardian who smoked and how many, if any, of their five best friends smoked. Students were also asked to indicate their frequency of visiting a convenience store, with response options being ‘practically every day, a few times a week, about once a week, about once a month or hardly ever’.

Following the method of Pierce et al. [12], students were categorized as non-susceptible never smokers, susceptible never smokers or experimenters. Students who reported trying smoking (even just a few puffs) were coded as ‘experimenters’. Students who had never smoked and indicated they would definitely not try smoking cigarettes ‘soon’ and ‘in the next year’, and would definitely not smoke a cigarette if one of their best friends were to offer them one, were coded as ‘non-susceptible never smokers’. Students who did not answer ‘definitely no’ to each circumstance were considered ‘susceptible never smokers’.

Finally, an ‘others smoking’ variable was created by combining students’ responses to whether they had at least one parent who smokes, a sibling who smoked and how many of the respondent’s best friends smoked. This was a continuous variable, where a lower value indicated less exposure to cigarettes from family and friends.

**Analysis**

Chi-square analysis was used to determine whether random assignment produced equivalent groups in relation to tobacco use and other characteristics. To test hypotheses, generalized estimating equations (GEEs) with random effects were used to determine the effects of exposure to the three point-of-sale conditions, controlling for sex, smoking susceptibility and social and familial exposure to smoking. The school attended by respondents was treated as a random effect to account for clustering by school.

Logistic regression analyses were used to examine the relationship between the cigarette brands respondents thought were most popular among students and adults, and those cigarette brands that were advertised or displayed in the pictured stores.

**Results**

**Sample characteristics**

The sample of 605 students consisted of 51% females, 41% of students had tried smoking cigarettes and 9% currently smoked. Of those who had not yet tried smoking, 11% said they would probably or definitely try a cigarette soon and 8% reported they would probably or definitely try smoking during the next year. Over one-third (36%) of students had at least one parent or guardian who smoked, 21% said they had at least one older brother or sister who smoked and 45% reported at least one of their best friends smoked.

Table I shows that the characteristics of students were equally distributed by condition in relation...
to demographic characteristics and peer and family exposure to smoking.

Regardless of experimental condition, students who were experimenting with smoking visited convenience stores more often (\(X = 3.1\), on scale of 1 = practically every day to 5 = hardly ever) than those students who were susceptible non-smokers (\(X = 3.5\) (\(P = 0.002\)) and those who were non-susceptible non-smokers (\(X = 3.7\) (\(P < 0.01\)). There was no significant difference between the latter two conditions.

**Perceived access to tobacco**

Table II indicates that students who were exposed to either the cigarette display or the cigarette advertising conditions perceived it would be less difficult for either themselves or students their age to purchase tobacco, than those students who saw the no cigarettes condition (\(P = 0.000\)). In addition, students who saw the cigarette advertising condition were less likely than respondents in the no cigarettes condition to report that they would be asked for proof of age if they tried to buy cigarettes (\(P = 0.01\)).

On average, students reported that at least one store in their neighbourhood would sell cigarettes to them (\(X = 1.5\) stores) or students their age (\(X = 1.8\) stores). Students who saw the no cigarettes condition tended to report a lower number of neighbourhood stores would sell them cigarettes (\(X = 1.4\) stores), compared with those who saw the cigarette advertising point-of-sale (\(X = 1.7\) stores).

### Table I. Student characteristics, by exposure condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>a. No cigarettes (n = 210) %</th>
<th>b. Cigarette display (n = 203) %</th>
<th>c. Cigarette advertising (n = 192) %</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Female</td>
<td>50.5</td>
<td>48.5</td>
<td>53.8</td>
<td>0.58</td>
</tr>
<tr>
<td>Yes, at least one parent smokes</td>
<td>34.8</td>
<td>35.5</td>
<td>37.8</td>
<td>0.81</td>
</tr>
<tr>
<td>Yes, at least one of best friends smokes</td>
<td>43.1</td>
<td>45.5</td>
<td>46.4</td>
<td>0.79</td>
</tr>
<tr>
<td>Yes, has tried smoking</td>
<td>38.5</td>
<td>43.3</td>
<td>41.8</td>
<td>0.60</td>
</tr>
<tr>
<td>Yes, currently smokes</td>
<td>9.9</td>
<td>7.4</td>
<td>8.7</td>
<td>0.67</td>
</tr>
<tr>
<td>Visits convenience stores at least a few times a week</td>
<td>28.4</td>
<td>26.4</td>
<td>25.1</td>
<td>0.63</td>
</tr>
</tbody>
</table>

### Table II. Perceived access to cigarettes, by exposure condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>a. No cigarettes (n = 210) (\bar{X})</th>
<th>b. Cigarette display (n = 203) (\bar{X})</th>
<th>c. Cigarette advertising (n = 192) (\bar{X})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty of access to tobacco at pictured store(^a)</td>
<td>3.2</td>
<td>2.9(^b)</td>
<td>2.8(^b)</td>
</tr>
<tr>
<td>Likelihood of being asked proof of age(^c)</td>
<td>2.5</td>
<td>2.7</td>
<td>2.8(^d)</td>
</tr>
<tr>
<td>No. of stores in neighbourhood that would sell you cigarettes</td>
<td>1.4</td>
<td>1.5</td>
<td>1.7(^e)</td>
</tr>
<tr>
<td>No. of stores in neighbourhood that would sell cigarettes to students your age</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Covariates = sex, ‘susceptibility’ and ‘others smoking’, random effects = school id.

\(^a\)Scale: 1 (very easy) to 5 (very hard). \(^b\)Significantly different (\(P < 0.01\)) to condition a: no cigarettes. \(^c\)Scale: 1 (very likely) to 5 (very unlikely). \(^d\)Significantly different (\(P < 0.05\)) to condition a: no cigarettes. \(^e\)Trend towards a significant difference (\(P < 0.1\)) between condition a: no cigarettes.
There was no exposure effect for the number of neighbourhood stores that participants thought would sell to ‘students their age’.

### Normative beliefs about smoking

On average, students thought ~30% of students their age smoke cigarettes at least once a week, with no significant differences between the experimental conditions (Table III).

However, those in the cigarette advertising condition reported on average that ~52% of high school students smoked at least once a week, compared with those who saw the cigarette display condition, who estimated ~48% of high school students smoke ($P = 0.03$).

Respondents who saw the cigarette advertising condition also thought a higher proportion of adults smoke (63%) than did those who saw the cigarette display condition (59%).

There was little variation between experimental conditions and students’ approval of smoking ($P > 0.10$). Students also tended to disagree with statements attributing positive characteristics to teenagers who smoked, with no significant differences between experimental conditions (Table III).

### Perceived harm of smoking

Regardless of survey condition, most students agreed that smoking can harm your health ($\bar{X} = 1.3$, $SD = 0.81$). Over half of students (52%) considered smoking <10 cigarettes a day ‘very dangerous’. However, only 15% of students thought smoking one or two cigarettes occasionally was ‘very dangerous’, with a further 55% considering it ‘a little dangerous’ and 25% ‘not dangerous’. Students who saw the cigarette advertising condition were significantly more likely ($P = 0.02$) to consider smoking one or two cigarettes occasionally as less dangerous ($\bar{X} = 1.9$), than were respondents who saw the cigarette display condition ($\bar{X} = 2.1$) (Table IV).

### Future intentions to smoke

Students who saw the cigarette advertising condition tended to be more likely to suggest that they would smoke a cigarette any time during the following year ($\bar{X} = 2.0$, on scale of ‘1 = definitely not’ to ‘4 = definitely yes’), compared with those

#### Table III. Perceived smoking prevalence, by exposure condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>a. No cigarettes ($n = 210$)</th>
<th>b. Cigarette display ($n = 203$)</th>
<th>c. Cigarette advertising ($n = 192$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived prevalence among</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Year 9 students</td>
<td>28</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>High school students</td>
<td>52$^a$</td>
<td>48</td>
<td>52$^b$</td>
</tr>
<tr>
<td>Adults</td>
<td>62$^a$</td>
<td>59</td>
<td>63$^b$</td>
</tr>
<tr>
<td>Teenagers who smoke seem$^c$</td>
<td>$X$</td>
<td>$X$</td>
<td>$X$</td>
</tr>
<tr>
<td>Cool</td>
<td>3.9</td>
<td>4.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Successful</td>
<td>4.2</td>
<td>4.3</td>
<td>4.2</td>
</tr>
<tr>
<td>Smart</td>
<td>4.2</td>
<td>4.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Healthy</td>
<td>4.5</td>
<td>4.5</td>
<td>4.6</td>
</tr>
<tr>
<td>Athletic</td>
<td>4.2</td>
<td>4.2</td>
<td>4.2</td>
</tr>
<tr>
<td>Popular</td>
<td>3.2</td>
<td>3.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Peer approval of smoking</td>
<td>2.7</td>
<td>2.8</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Covariates = sex, susceptibility and others smoking; random effects = school id.
$^a$Trend towards a significant difference ($P < 0.1$) between condition b: cigarette display. $^b$Significantly different ($P < 0.05$) to condition b: cigarette display. $^c$Scale: 1 (strongly agree) to 5 (strongly disagree).

#### Table IV. Perceived harm of smoking, by exposure condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>a. No cigarettes ($n = 210$)</th>
<th>b. Cigarette display ($n = 203$)</th>
<th>c. Cigarette advertising ($n = 192$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking can harm your health$^a$</td>
<td>1.4</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Smoking &lt;10 cigarettes per day is ...$^b$</td>
<td>2.7</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Smoking one or two cigarettes per day is ...$^b$</td>
<td>2.0</td>
<td>2.1</td>
<td>1.9$^c$</td>
</tr>
</tbody>
</table>

Covariates = sex, susceptibility and others smoking; random effects = school id.
$^a$Scale: 1 (strongly agree) to 5 (strongly disagree). $^b$Scale: 1 (not dangerous) to 3 (very dangerous). $^c$Significantly different ($P < 0.05$) to condition b: cigarette display.
who saw the cigarette display condition ($\bar{X} = 1.9$) ($P = 0.07$).

Examining only students who had not yet tried smoking ($n = 348$), those who had been exposed to the cigarette advertising condition, were more likely to suggest that they would smoke a cigarette if one of their best friends offered them one, compared with those who saw the cigarette display condition ($P = 0.039$). However, no significant exposure effects existed for never-smokers’ intentions to try a cigarette ‘soon’ or during the following year ($P > 0.1$).

**Perceived popularity of cigarette brands and brand preferences**

As shown in Table V, when asked to name cigarette brands that were most popular among adult smokers, students exposed to the cigarette advertising condition were more likely to report a cigarette brand that was advertised (Winfield, Horizon, Benson & Hedges, Marlboro or Lucky Strike), compared with those exposed to the no cigarettes condition ($P = 0.049$). There was also a trend for respondents exposed to the cigarette advertising condition to report one of the advertised brands, more than those who saw the cigarette display condition ($P = 0.057$).

Tobacco brands that were prominently visible in the displays of the cigarette display and cigarette advertising conditions (i.e. Winfield, Horizon, Benson & Hedges, Alpine and Dunhill) were also related to which brands students thought were most popular among adults. There was a trend for those respondents who saw the cigarette display condition to report brands that were prominently displayed, more than students who saw the no cigarettes condition ($P = 0.052$).

There were no significant differences between conditions in relation to the brands respondents thought were popular among students their age who smoke. However, when respondents were asked which cigarette brand they would try if they smoked, those exposed to the cigarette advertising condition also tended to report an advertised brand more than those who saw the cigarette display condition ($P = 0.09$).

**Discussion**

This experimental study aimed to assess whether cigarette pack displays in retail stores influenced students’ perceptions about smoking in ways similar to those previously found for retail tobacco advertising [4].

<table>
<thead>
<tr>
<th>Table V. Perceived cigarette brand popularity and brand preferences, by exposure condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. No cigarettes $(n = 210)$</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>Popular cigarette brands smoked by ...</td>
</tr>
<tr>
<td>Students</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Adults</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Which brand would you try?</td>
</tr>
<tr>
<td>Reported advertised brand</td>
</tr>
<tr>
<td>Reported prominently displayed brand</td>
</tr>
</tbody>
</table>

*a*Significantly different ($P < 0.05$) to condition a: no cigarettes. *b*Trend towards a significant difference ($P < 0.1$) between condition b: cigarette display. *c*Trend towards a significant difference ($P < 0.1$) between condition a: no cigarettes.
Overall, our results suggest that the presence of cigarettes at the point-of-sale—whether cigarette display only or display plus tobacco advertising—increased students’ perceptions about the ease of purchasing cigarettes. In addition, the presence of tobacco advertising decreased students’ perceived likelihood of being asked for proof of age and tended to increase perceptions of the number of stores that would sell them cigarettes. This pattern of findings suggests the presence of displays in retail stores serve to create the perception among students that cigarettes are easily available and accessible in their community, while the presence of tobacco advertising further strengthens perceived ease of accessibility of cigarettes.

Our study findings also suggest that, like advertising, the cigarette pack display is an effective vehicle for promoting brand recall, as evidenced by the cigarette brands reported by students to be the most popular among adult smokers. High recall of cigarette brand names that were advertised in the pictured store, as well as cigarette brands that were prominent in the displays, suggests that tobacco companies are effectively using cigarette packaging displays as a communication device for creating and reinforcing brand awareness and recognition [7]. Cigarette brand names that were advertised in the pictured store also tended to affect the brands of cigarettes students reported they might try if they did smoke.

Exposure to point-of-sale advertising, but not displays, tended to weaken student’s resolve not to smoke in the following year. Findings also indicate that exposure to advertising, as opposed to a pack display on its own, influenced whether students would accept a cigarette from one of their friends if they offered. In countries such as the United States in which point-of-sale tobacco advertising has continued to proliferate, this is great cause for concern. US Federal Trade Commission figures indicate that in 2002, tobacco companies spent $12.47 billion on tobacco promotion, a considerable amount of which was focused on the point-of-sale [13].

No effects were observed for most variables measuring perceived harm from smoking, except the perceived danger of smoking one or two cigarettes per day, which was significantly higher among those in the cigarette advertising condition than those in the cigarette display condition. Overall, we found no consistent effects of cigarette advertising or display on peer approval for smoking, the likelihood of positive attributes being ascribed to smokers, or overall harm from smoking. Several of the perceived harm variables and all the smoker attribute variables were highly skewed in a desirable direction, suggesting established views about smoking which may not be easy to manipulate by a single experimental exposure.

Results from this study support some of the findings of the experimental study of Henriksen et al. [4]. Like Henriksen et al., we found that retail cigarette advertising induced significantly easier perceived access to cigarettes and increased perceived smoking prevalence of high school students and adults. However, unlike Henriksen et al., cigarette advertising did not influence perceived prevalence of smoking among students their own age. We also did not find advertising to induce more positive appraisals of smokers. There were differences between our study and that of Henriksen et al. that may have accounted for differences in some findings. These include the fact that students are no longer routinely exposed to retail tobacco advertising in Australia, that Australian students were in Grade 9 (aged 14–15 years) only, rather than Grades 8 and 9 (aged 13–15 years), that Australian students were recruited by active, rather than passive consent, and that Australian students were exposed to only one photograph in each condition, rather than two. However, given these methodological and contextual differences, the fact that we did find experimental effects for most variables used in both studies suggests that the effects are relatively robust.

There were several study limitations, not the least of which was that the stimulus conditions were artificial. Students briefly viewed one of the three manipulated point-of-sale photographs in a classroom setting, rather than visiting a real store environment, so they may have perceived the photographs to be unrealistic, and may not
have responded in the same way to a real life situation. However, the fact we did observe effects of the different point-of-sale photographs on students’ perceptions about smoking even with a brief exposure suggests that the influence of cigarette advertising as well as pack displays in the actual store environment is probably considerable. In addition, we cannot be certain that the responses of students who saw the store with no cigarettes were not influenced by their own memory of what a convenience store ‘usually’ looks like (i.e. in Victoria, with the presence of tobacco displays). Over one-third (35%, n = 74) of students who saw the store with no cigarettes reported that they had seen tobacco products, even though there was none present, and this false recognition was positively related to being a current smoker (P < 0.05). It is possible that due to students’ misperceptions of what they had seen during the experimental manipulation we may not have achieved a ‘clean’ measure of student’s exposure to a store with no tobacco products, and therefore condition effects may have been diluted. This also suggests that cigarette displays maybe extremely salient to smoking teenagers and can potentially influence their recollections of this type of marketing.

We confirmed the finding of Henriksen et al. [6] that frequency of student visits to convenience stores was associated with a higher likelihood of experimenting with cigarettes, one interpretation being that there may be long-term cumulative effects of point-of-sale exposure. Future research might aim to study students’ brand recall and perceptions about smoking immediately after exiting real stores that vary in dominance of cigarette displays at the point-of-sale.

A strength of the study was that we were able to randomize students to conditions within classrooms, rather than randomizing whole classrooms, as in the study of Henriksen et al. [4]. However, since data collection occurred within classrooms and only five schools were involved, there may still be clustering of respondents, so to be conservative, we analysed the data using GEEs with random effects, where the school attended by respondents was treated as a random effect. We also controlled for sex, smoking susceptibility and social and familial exposures to cigarette smoking. Thus, the effects observed in this study are independent of these other well-known influences on smoking perceptions.

### Implications

This study suggests that the presence of cigarette displays at the point-of-sale, even in the absence of cigarette advertising, has adverse effects on students’ perceptions about ease of access to cigarettes and brand recall, both factors that increase the risk of taking up smoking [14, 15]. Furthermore, the study suggests that cigarette advertising has similar effects, and may also weaken students’ firm intentions not to smoke in future, a measure that also strongly predicts smoking uptake [16]. These findings make a case for eliminating cigarette advertising at the point-of-sale, and also for placing cigarettes out of sight in the retail environment, as has happened in Saskatchewan, Canada [17]. Such a move may help to curb the alarming rate of smoking uptake among adolescents.

### References

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